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Research Article

Detection of hypertension and its associated factors among Dessie Town Government School Staffs, Amhara Region, Dessie, Ethiopia, 2019

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Abstract

Introduction: Hypertension is the leading remediable risk factor for cardiovascular disease, affecting more than 1 billion people worldwide, and is responsible for more than 10 million preventable deaths globally each year. Hypertension can be described as the 'Sleeping snake', which bites when it wakes up.

Objectives: To detect hypertension and its associated factors among staffs of Dessie town government schools from December 10, 2018 to February 15, 2019 G.C.

Methods and materials: An institution-based cross-sectional study design was conducted among 225 Dessie town government school staffs whose age of 35 years and above. Systematic random sampling technique to select sample size of participants. Data was cleaned manually, coded and entered into Epi-info and analyzed by SPSS version 22 software. Multivariable logistic analysis AOR, 95% CI and *p* - value < 0.05 was used to identify variables which have significant association.

Results: From the total of 225 study participant's 31(13.8%) of them diagnosed with hypertension. Multivariable logistic analyses had shown that 1st degree holders AOR (CI) = 3.05 [0.91,13.43], source of information from news AOR(CI) = 2.1 [0.816, 4.89], being protestant in religion AOR (CI)= 5.65 [0.74, 42.86], age from 41-60 years AOR (CI) = 1.96 [0.18,18.90], being divorced AOR (CI) = 2.35 [0.91,5.84], and teachers AOR (CI) = 3.4 [1.2, 9.825] maintain their significant association with detection of hypertension.

Conclusion and Recommendation: From this study significant numbers of respondents have hypertension. Educational status, source of information, marital status, occupation, religion and age of respondents were predictors for the occurrence of hypertension. Newly diagnosed hypertension on this was high among government school staffs which have no information about their blood pressure; which shows there was poor coverage of health screening.

More Information

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Keywords: Detection; Hypertension; Associated factors

Abbreviations: BP: Blood Pressure; BSC: Bachelor of Science; CI: Confidence Interval; CO-I: Co Investigators; HTN: Hypertension; MMHG: Millimeter Mercury; OR: Odds Ratio; P: Prevalence; PI: Principal Investigator; SPSS: Stastical Package for Social Sciences; TCOM: Tropical College Of Medicine

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Introduction

Hypertension or high blood pressure is the force that blood exerts on the vessel wall which varies continuously in arteries due to the intermittent nature of the pump (heart) and elastic recoil of the arterial wall [1]. The maximum arterial pressure during systole is called systolic blood pressure and minimum arterial pressure during diastole is called the diastolic blood pressure [2]. Contrasting to most diseases, hypertension has no symptoms and is therefore called the "silent killer". The World Health Organization also stated that hypertension is the chief important cause of cardiovascular death [3,4].

While hypertension can be successfully diagnosed and treated, only one in seven persons with hypertension have controlled blood pressure [11]. Hypertension is said to be asymptomatic and so it could equally cause fatalities even without necessarily showing any symptoms[1]. Improvement of its management to reduce adverse cardiovascular outcomes will require an understanding of the patient characteristics and treatment factors associated with uncontrolled blood pressure [12]. Despite the availability of multiple effective

antihypertensive medications with proven benefits in reducing cardiovascular morbidity and mortality, control of hypertension remains poor. In both high and low income countries, only less than 27% and 10% respectively of hypertensive patients have achieved their target blood pressure [12].

Hypertension risk factors are both modifiable and non-modifiable. Non-modifiable factors are age, gender, ethnicity, and family history of hypertension or diabetes. Modifiable risk factors for hypertension are poor dietary and self-care practices such as excessive salt and fat intake, inadequate exercise or physical activity, excessive alcohol use etc. Some factors that contribute to hypertension are similar to those of other major chronic diseases for example unhealthy diet and inadequate exercise [11].

Many studies in the world and in Ethiopia had been studied at institutional (hospital level) however up to the researcher's knowledge there is shortage of literatures done through measuring BP at the community level in Ethiopia particularly to the study area. So this study was intended to detect magnitude of hypertension and associated factors among government school staffs in Dessie town which was targeted to the most neglected community in Ethiopia through measuring their Blood pressure.

This study is planned to determine the prevalence of hypertension and its associated factors among Dessie town government school staffs. Since there is no adequate research done regarding with this topic in different areas of Ethiopia, it will be the base line for future research. It helps policy makers to give much attention to hypertension in order to control blood pressure. In education, it will show gaps to give emphasis to hypertension in order to incorporate in the curriculum development.

The findings of this study was used as a base for the local health official specifically those who are managing the community with the problem to educate, invoke, and cooperate with their clients to improve management of hypertension. It helps staffs to aware their blood pressure status and its associate factors.

General objective

To detect the prevalence of hypertension and its associated factors among Dessie town government school staffs.

Specific objectives

To determine prevalence of hypertension among Dessie town government school staffs from December 10 up to February 15, 2019 GC.

To identify factors associated with hypertension among Dessie town government school staffs from December 10 up to February 15, 2019 GC.

Methods and materials

Study area and period

Dessie city is the capital city of south wollo zone which is located 401km away from Addis Ababa, the capital city of Ethiopia and 480 kms from Bahirdar, the capital city of Amhara regional sate. It lies at an altitude of 8,100 feet (2,470 meters). The study was conducted from December 10 up to February 15, 2019 G.C.

Study design: Institutional-based cross sectional study design was conducted.

Source of population: All permanent staffs of Dessie town government schools with age of 35 and above.

Study population: All permanent staffs of Dessie town government schools with age of 35 and above who will present on the data collection period. To select study units peoples who will fulfill the inclusion criteria and have willingness to participate.

Inclusion criteria: All male and female Dessie town government school staffs whose age is ≥ 35 years old and who have willingness to participate in this study was included.

Exclusion criteria: Those staffs that was not present in the specified data collection period and those who will not have willingness after giving the detailed information was excluded from the study.

Sample size determination

The size of study participants that was recruited in to the research is calculated using the single

Population proportion formula.

$$N = \frac{Z\alpha /_2^2 (p(1-p)}{d^2}$$

Sample size was calculated by considering level of confidence of 95%, and margin error 5%.

Where p - Proportion of patients (23.5%)[4] who will have hypertension q- Proportion of patients (76.5%) who don't have hypertension, d2-margin of error, N- minimum sample size. Substituting the values for each of these variables in the above formula, the sample size is to be 280. Adding non-response rate of 10%, the final sample size is 306. Since the source population is less than

10,000. So using the formula to reduce sample

nf = ni

Where;

ni = initial sample size 1+ni- 1/N N = source population

nf = final sample size

So

nf = 306

1+ 306-1/820 = 225

Therefore the final sample size was = 225

Sampling procedure and techniques:

Proportional allocation of the specified sample for each school was made by considering the number of staffs recruited for each school whose age is ≥ 35 years old. Then sample units for each school was selected through systematic random sampling after calculating ''K'' value for all schools.

Study variables

Independent variables

- Socio-demographic characteristics, Environmental influences
- Family history of hypertension Social influences
- Self-care practice Health perception
- Income
- Dependent variable
- Detection of hypertension

Operational definitions:

Hypertension: Chronic increase in B/P ≥140/90mmhg in 3 consecutive B/P measurements in 3 different occasions.

Isolated systolic hypertension: Chronic increase in systolic B/P ≥140 mmhg and diastolic B/P of <90 mmhg in 3 consecutive B/P measurements in 3 different occasions Pre hypertension: B/P <140/90 mmhg and >120/80 mmhg in 3 consecutive B/P measurements in 3 different occasions.

Normotensive (normal): B/P of people between 90/60 mmhg and 120/80 mmhg

Hypotension: B/P of people less than 90/60 mmhg.

Data collection procedure

The data was collected from Dessie Town Government schools in 2 months and 2 weeks by 3 BSc nurses and 2 diploma nurses. The study was controlled by two supervisors who will have BSc nursing. The data collectors will introduce them to make rapport with staffs. They measure the blood pressure of each staffs whose age is above 35 years and give appropriate medical advice and only make interview to those selected by the sampling method.

Data collection tool

Interviewer administered structured questionnaire data collection tool was used, it contains three parts.

Part I was used to collect socio demographic data, part II was used to collect selfcare practice towards hypertension

Part III is used to collect the status of the blood pressure of study participants should be filled by data collectors after 3 consecutive measurement of B/P.

Data quality assurance

Both the data collectors and supervisors were trained for one day on the objective and methodology of the research, data collection approach. Pretest was conducted in 5% [16] of the samples in Tropical college of Medicine staffs to see the completeness, consistency, and applicability of the instruments and will ratify accordingly. This was used because patients in each facilities share many similarities. This also will give a feedback to me on whether the intended study objectives will captured well, any omissions and any need for additional items so that appropriate modification was made after viewing the pre- test result.

Data processing and analysis

Data was checked, cleaned and entered in to Epi-data software, and then it was imported to SPSS version 22.0 software for analysis. Descriptive statistics was used to describe the sample. The results of the descriptive statistics were expressed as percentage and frequency. Associations between independent variables and dependent variables were analyzed first using bi-variable analysis to identify factors which are significantly associated with the outcome variable. The magnitude of the association between the different independent variables in relation to dependent variables was measured using odds ratios and 95% confidence interval (CI) and P values below 0.05 was considered statistically significant.

Ethical consideration

Ethical clearance and official letter was obtained from Tropical college of Medicine research and Community service department. After getting permission letter from this department, written consent was obtained for willingness of staffs to participate in this study. Any information of each participant was kept confidentially.

Results

Socio-demographic characteristics of respondents

Out of the total two hundred twenty five planned sample of Government school staffs in Dessie town, (two hundred twenty five) of them were included in the study giving a response rate of 100 percent. The mean age of respondents was 52.4, out of the respondents 62.5% were within 41 - 60 age groups. From all respondents 71.1% were Teachers. Of those 51.6% were 1st degree holders educationally. Out of the study participants 73.77% of them were married, 43.6 % get monthly income of greater than 3000 Ethiopian birr, and 28%

of respondents earn monthly income less than 1500 Ethiopian Birr. Regarding family history of hypertension 79.6% of these staffs had no family history of hypertension.

Out of all 60.2% of the respondents get information from health professionals (Table 1).

Blood pressure status of respondents

From the total study participants among staffs of government schools 34.7% and 37.3% of them had blood pressure of 120/80 mmhg-139/89 mmhg and 90/60 mmhg -120/80 mmhg respectively. Out of all 13.8 % of respondents had diagnosed hypertension. Among all 8.4% of total respondents had diagnosed stage I hypertension and 5.3% of them diagnosed with stage II hypertension (Table 2, Figures 1,2).

From the total of 225 study participant's 31(13.8%) of them diagnosed hypertension, 34.7% of the study participants were categorized under High normal (120/80 -139/89 mmhg).

Table 1: Socio-demographic characteristics among Government school staffs, in Dessie city administration, Dec, 2019. (*n* = 225)

Variables category		Frequency	Percent
Sex	Female	95	42.2
	Male	130	57.8
Age	≤ 40 years	75	33.5
	41-60 years	140	62.5
	> 60 years	10	4.4
Religion	Orthodox	106	47.1
	Muslim	113	50.2
	Protestant	6	2.7
Ethnicity	Amhara	212	94.2
	Others	13	5.7
Marital status	Single	27	12
	Married	166	73.77
	Divorced	19	8.4
	Widowed	13	5.7
Educational status	Writing and reading Primary school Secondary school Diploma	10 22 14 51	4.4 9.8 6.2 22.7
	1st degree	116	51.6
	Master's degree	12	5.3
Occupation	Cleaners	21	9.3
	Security Guards	16	7.1
	Teachers	160	71.1
	Others	28	12.4
Family history of hypertension	Yes No	46 179	20.4 79.6
Source of information about hypertension and self-care practice	Books News Health education No information	33 16 126 50	14.7 7.1 56 22.2
Income	Less than 1500 birr 1500-3000 birr	63 64	28 28.4
	More than 3000 birr	98	43.6

Self-care practice towards hypertension

The findings of this study had shown that the mean score of total hypertension self-care practice was 37.69 ± 8.23; with dietary modification mean score of 19.46 ± 5.57, stress reduction of mean score 4.07 ± 1.42, regular physical activity mean score of 1.98 ± 0.96, Keeping weight down with mean score of 2.07 ± 0.87, see health workers regularly with mean of 3.25 ± 0.91 and moderation of alcohol with the 1.36 ± 0.75 (Table 3).

Table 2: Blood pressure status of study participants in government school staffs of Dessie city Administration, Dec, 2019, Dessie, Ethiopia (*n* = 225).

Variables	Category	Frequency	Percent
B/P status	< 90/60 mmhg 90/60 mmhg -120/80 mmhg	32 84	14.2 37.3
	120/80 mmhg-139/89 mmhg	78	34.7
	140/90 mmhg -159/99 mmhg	19	8.4
	160/100 mmhg -179/109 mmhg	12	5.3
Over all B/P	Hypertension	31	13.8

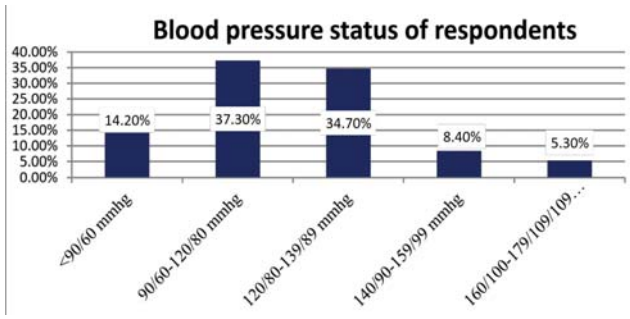

Figure 1: Blood pressure categorization of study participants in government schools of Dessie city Administration, Dec, 2019, Dessie, Ethiopia (*n* = 225).

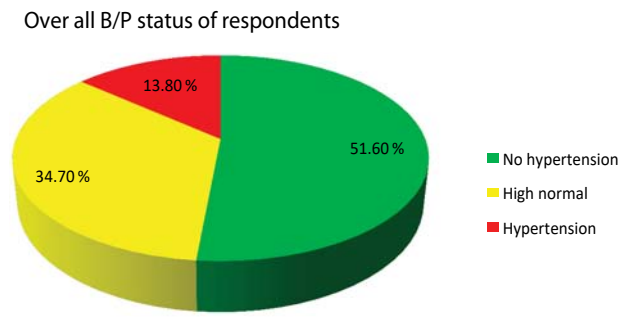

Figure 2: Theoverall magnitude of hypertension among respondents in government schools of Dessie city Administration, Dec, 2019, Dessie, Ethiopia (*n* = 225).

Table 3: Self-care practice of study participants in government school staffs of Dessie city. Administration, Dec, 2019, Dessie, Ethiopia (*n* = 225).

Item Minimum	Maximum	Mean(SD)	Range
Regular physical activity 1.0	4.0	1.98(0.96)	1.0
Dietary modification 9.0	3 5	19.46 (5.57)	26
Moderation of alcohol 1.0	4.0	1.36(0.75)	3.0
Practice non smoking 1.0	4.0	1.43(1.01)	3.0
Check B/P at home 1.0	4.0	1.41(0.85)	3.0
Keep weight down 1.0	4.0	2.07(0.87)	3.0
See health workers 1.0 regularly	4.0	3.25(0.91)	3.0
Stress reduction 2.0	8.0	4.07(1.42)	6.0
Total Self-care practice 21	63	37.69(8.23)	42

Factors associated with magnitude of hypertension

Bivariate analysis and multiple logistic analyses showed that there were significant associations between detection of hypertension and educational status, source of information, religion, age, marital status, and occupation of the respondents maintain their significant association with detection of hypertension. Multivariate analysis revealed that there was statistical association between hypertension and educational status. Study subjects who were 1st degree holders were approximately three times more likely to have hypertension as compared with those who had no formal education. {(p = 0.01, AOR (95%CI) = 3.05 [0.91,13.43]}. Study subjects whose age were from 41-60 were approximately two times more likely to have hypertension as compared with those whose age were less than 40 years. {(p = 0.04, AOR (95%CI) = 1.96 [0.18, 18.90]}.

Study subjects who were divorced are two time more likely to have hypertension as compared with subjects who were single. {(p = 0.03, AOR (95%CI) = 2.35 [0.91, 5.84]. Study participants who were teachers were 3 times more likely to have hypertension as compared with subjects who were cleaners {(p = 0.02, AOR (95%CI) = 3.4 [1.2, 9.825]).

Study participants who had hypertension information from news were two times more likely to had hypertension to those who had information through books {(p = 0.02, AOR (95%CI) = 2.1 [0.816, 4.89]}. Study participants whose religion were protestant were approximately six times more likely to had hypertension to those whose religion were orthodox Christian followers {(p = 0.01, AOR (95%CI) = 5.65 [0.74,42.86]} (Table 4).

Discussion

This study was conducted with the intention to detect hypertension and associated factors among government school staffs of Dessie city administration. The findings of this study shown that 87 (38.6%) of staffs were within the B/P of 120/80 mmhg-139/89 mmhg. This result implies that significant number of teachers and other administrative staffs will join to hypertension with in few years since their blood pressure was at the boundary of hypertension.

From all study participants about half 22 (9.8%) of them had hypertension. This result was similar to the study conducted in Addis Ababa (10.5%), higher than study in Birsheleqo Ethiopia (4.1%) and lower than study conducted in Nepal [22-24]. This might be study done Birsheleqo, Ethiopia might not have age restriction for selecting study participants however in this study there is age restriction (≥ 35 years) which is known non modifiable risk factor for the occurrence of hypertension. In other ways this study participants were government school staffs so that this study participants might have better income which will increase risk of developing hypertension compared to study participants in Birsheleqo, Ethiopia which was studied to whole community at hospital

Table 4: Factors affecting detection of hypertensive in public health institutions of Dessie city Administration, May 2020, Dessie, Ethiopia.

Variable	Category	Over all B/P status		COR 95% CI	AOR 95% CI	p - value
		Hypertension	No hypertension			
Age	≤40	5	70	1.0	1.0	0.06
	41-60	24	116	1.75[0.18,16.9]	1.96[0.18,18.90]	0.04
	>60	2	8	0.6[0.07,5.06]	0.5[0.06,4.16]	0.08
Marital status	Single	3	24	1.0	1.0	0.01
	Married	17	129	2.56[0.61,10.81]	2.67[0.8,11.81]	0.017
	Divorced	3	16	2.43[0.95,6.24]	2.35[0.91,5.84]	0.03
	Widowed	8	25	1.71[0.39,7.41]	1.65[0.35,6.39]	0.011
Educational status	Writing and reading	2	8	1.0	1.0	0.042
	Primary school	1	21	0.2[0.015,3.793]	0.16[0.025,3.53]	0.436
	Secondary school	3	11	0.9[0.081,5.494]	0.85[0.061,4.49]	0.6
	Diploma	1	46	0.09[0.93,10.12]	0.095[1.03,11.1]	0.26
	1st degree	22	94	3.28[1.01,12.54]	3.05[0.91,13.43]	0.013
	Master's degree	2	10	0.8[0.07-3.07]	0.7[0.04-2.93]	0.09
Source of information	Books	4	29	1.0	1.0	0.1
	News	4	12	2.4[0.916, 5.89]	2.1[0.816, 4.89]	0.02
	Health education	19	107	1.28[0.069,4.62]	1.16[0.058,4.03]	0.5
	No information	4	46	0.63[0.02,2.201]	0.60[0.01,2.101]	0.8
Occupation	Cleaners	1	20	1.0	1.0	0.04
	Security guards	2	14	2.85[1.016, 8.06]	2.78[1.116, 7.06]	0.03
	Teachers	25	135	3.7[1.01, 10.83]	3.4[1.2, 9.825]	0.02
	Others	3	25	2.4[0.92,9.94]	2.02[0.82,9.05]	0.035
Family history of hypertension	Yes	5	41	2.7[1.621,4.51]	2.3[1.02,3.512]	0.049
	No	26	153	1.0	1.0	0.1
Religion	Orthodox	12	94	1	1	
	Muslim	17	96	1.38[0.74,6.86]	1.4[0.851,8.85]	0.06
	Protestant	2	4	3.9[0.65, 23.71]	2.5[0.32,16.86]	0.01

level. Other differences might be due to difference in sample size, socio-economic status of population, health service coverage of countries and year of study conducted.

This study ascertained that there is statistical association between hypertension with educational status, source of information, religion, age, marital status, and occupation.

Multivariate analysis revealed that there was statistical association between hypertension and educational status. Study subjects who were 1st degree holders were more likely to have hypertension as compared with those who write and read only. This might be related to the fact that the study participants with higher educational level had higher age in which is high risk for hypertension, which affects their B/P positively. In other ways study participants with better educational level might have better income so that it might increase their blood pressure.

Study participants who were teachers were more likely to have hypertension as compared with subjects who were cleaners. This differences might be due to teachers might have better income (salary) than cleaners so that this having better income might increase their blood pressure

Study subjects who were divorced were more likely to have hypertension as compared with subjects who were single. This might be divorced staffs might have feeling of anger and emotional that increases pumping power of the heart and sympathetic vasoconstriction that directly leads to increase their blood pressure. In other ways divorced study participants have addiction of alcohol drinking, cigarrate smoking and other substance abuse which might increase the risk of developing hypertension [21].

Study subjects whose ages were from 41-60 were more likely to have hypertension as compared with those whose age was less than 40 years. This might be due to the fact that age is the major risk factor for the occurrence hypertension. When age increases blood (plasma) volume and vasoconstriction increases so that blood pressure might be increased [21].

Study participants who had hypertension information from news were more likely to had hypertension compared to those who had information through books.

This might be information disseminated through broadcasts will be more power full to be careful to prevent hypertension through implementing hypertension prevention practices.

Strength of study

- ✓ High response rate which is 100%
- ✓ Nine government schools were included to make the study representative
- ✓ Since prevalence of hypertension might be different from schools.
- ✓ More data collectors were recruited and adequate training was given to keep quality of data collection.
- ✓ Blood pressure status of non-selected school staffs and study participants were measured and medical advice and referral was made with full sponsor of Tropical College of medicine.

Limitations of study

- ✓ Difficulty of understanding by respondents to some of the study variables.
- ✓ Limitation of related literatures to compare and discuss some of the findings.
- ✓ Because the data are cross sectional, the direction of causal relationship between variables can't always be determining.
- ✓ The data collection was not completed on the predetermined time plan due to different factors.

Conclusion

From all staffs 13.8 % of respondents have hypertension. This study had shown that there was statistically significant association between Hypertension and educational status, marital status, occupation, religion, source of information and age of respondents.

Despite health service coverage of Ethiopia had improvement; on this study newly diagnosed hypertension that has no information about their blood pressure before was high which shows there was poor coverage of health screening.

Recommendation

Health care personnel should increase community awareness towards the importance of BP screening and strongly promote self-care practice to prevent hypertension via strengthening information education communication.

Nursing research should be carried out to investigate the level of hypertension through measuring their BP in broader social context and larger sample size.

All academic higher educational health institutions should work intensively on community services including periodic B/P screening to the community especially.

All nurses' workings on hypertension should give strict advice on importance of periodic screening of B/P for staffs which has age of greater than 35 years during their community health care schedule and develop educational programs and activities to educate staffs on the prevention and treatment of hypertension.

The society particularly family members and friends

should support and encourage those people about danger of hypertension and to do self-care practice to control high blood pressure.

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Authors 'contributions: SA contributed to designing the study and collected the data, analysed the data and AE wrote the final report and manuscript. All the authors read and approved the version for submission.

Ethics approval and consent to participate: Ethical approval was obtained from the Ethical Review Committee of Tropical College of medicine. Permission letter was received from Dessie Education office.

Consent for publication: All the participants consented to publish the study in this journal

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